

InLCA: Eco-Labeling and Purchasing

Whole Life Considerations in IT Procurement

David Matthews^{1*} and Shirli Axelrod²

¹ Technology Manager, City of Seattle Legislative Dept. 600 4th Ave, City Hall Floor 3, Seattle, WA 98103-1859, USA

² Seattle Public Utilities, 700 5th Ave, Suite 4400, Seattle, WA 98104, USA

* Corresponding author (david.matthews@seattle.gov)

Abstract

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Goal, Scope and Background. Waste associated with the manufacture, use, and disposal of electronic products, or e-waste, is a growing threat to the environment. IT procurement professionals can have a positive affect against that threat through careful consideration of the environmental awareness of their vendors.

Method. Consideration of three case studies from the City of Seattle illustrates the challenges in gathering information from vendors on their environmentally sustainable practices; the reasons that this information is important; and possible solutions.

Conclusions and Recommendations. We owe it to ourselves, our planet and our progeny to encourage sustainable practices in electronics manufacturing, use and recycling. This paper suggests some beginning steps that purchasers of electronics can take toward that end.

Keywords: Computer manufacturing; computer recycling/reuse; environmentally aware computer manufacturers; e-waste; IT procurement; sustainable electronics practices; toxins in computers

Introduction

The City of Seattle has long been considered a leader in environmentally sustainable purchasing practices. In recent years, the City has made efforts to extend that culture of whole life responsibility to the purchase of its Information Technology (IT) equipment. For some of us in the IT purchasing staff, this was a new way of looking at IT procurement.

We will discuss the reasons we think this is an important trend that should be emulated in other government and corporate purchasing departments. To illustrate the City's commitment to this new paradigm in IT procurement we will present case studies of three recent purchasing decisions and give some examples of our ongoing relationship with the City's main computer workstation vendor. These relationships have grown and have been positively affected by the City's stated environmental goals. Finally we'll look at the tools that are available today to help procurement staff meet these goals and some tools that are coming in the near future.

1 The Problem, or Why Should We Care?

Information Technology (IT) equipment is a unique and challenging environmental problem. From the manufacturing process, through the packaging and delivery and the end of

life, this equipment presents many sustainability issues to a conscientious purchaser.

According to the Silicone Valley Toxics Coalition (<http://www.svtc.org/cleancc/focus.htm>, and see the link to the SVTC in the references addendum), the manufacturing of a computer includes the "assembly of more than 1,000 materials, many of which are highly toxic, such as chlorinated and brominated substances, toxic gases, toxic metals, photo-active and biologically active materials, acids, plastics and plastic additives. Comprehensive health impacts of the mixtures and material combinations in the products are often not known. The production of semiconductors, printed circuit boards, disk drives and monitors uses particularly hazardous chemicals, and workers in chip manufacturing are reporting cancer clusters and birth defects. In addition, new evidence is revealing that computer-recycling employees have high levels of dangerous chemicals in their blood.

The list of toxic components in computers also includes lead and cadmium in computer circuit boards, lead oxide and barium in computer monitors' cathode ray tubes, mercury in switches and flat screens, and brominated flame retardants on printed circuit boards, cables and plastic casing. When we consider the fact that all landfills leak – even the best are not completely tight and eventually allow a certain amount of chemical and metal leaching – the mountains of e-waste destined for landfills is particularly disturbing."

The production of a single six-inch silicon wafer generates 2,840 gallons of wastewater, 25 pounds of sodium hydroxide and seven pounds of hazardous waste (Karliner 1997).

When the equipment is transported it is encased in many layers of protective boxing, plastic and foam that often end up in our landfills. Of course the transport itself contributes to air quality problems and must be considered in the whole life impact assessment.

During the use of the equipment, it may contribute to ergonomic problems for users such as eyestrain from monitors or repetitive movement injuries from the use of the keyboard and mouse. Computer use also affects HVAC (heating ventilation and air conditioning) and other environmental quality systems, and it consumes electricity.

Finally, at the end of life the lead, plastics and other toxins that reside in various parts of the equipment should be carefully separated and recycled. However for many years this simply was not done and even now it is a difficult and costly process.

The results of this historical lack of environmental stewardship are a staggering amount of toxic electronic waste. The lead alone in all of the old monitors and television sets that have accumulated in landfills presents a very real threat to the health of the planet and our progeny.

Another, more recent historical dysfunction in this regard has been the shipping of electronic waste products to third world countries. Please refer to the excellent work by the Basel Action Network, which documented the lack of health or environmental protections during recovery of materials from electronics. Their work exposes the horrors of this practice and the very real cost in human suffering.

We feel it is important to find ways to ensure that the vendors from whom we purchase our electronics are working toward more sustainable practices in all levels of the life cycle of their equipment. Further, we try to be aware of and consider the vendor corporation's social equity stance. Are they a good citizen of their community? Do they have a clean record on race relations? Do they use 3rd world labor? If so, do they treat those 3rd world employees with respect and pay them a living wage? These and other social equity questions are also the responsibility of a conscientious procurement official.

But how can our often overtaxed and under-resourced procurement departments ever expect to gather that information effectively? It is difficult, some might say impossible, in many cases. And that is what we will talk about with the three case studies from the City of Seattle.

2 The Stories, or What It's Like in the Trenches

2.1 Case study 1 – laptops

The first procurement example that we will share with you was a process to decide if we should standardize on a single vendor for all our laptop purchases. We had made the decision to standardize on one vendor for all desktop equipment and it was thought that we should explore the next step by looking at laptops.

Standardization is in and of itself a sustainable practice. By working to standardize on hardware, software and peripheral IT (Information Technology) equipment, we have recognized substantial cost savings (for more details, please see the references addendum and feel free to contact the City of Seattle's Copernicus director). We have also reduced the resources needed for maintenance and support of that equipment.

The committee responsible for the laptop standardization started out with the usual paradigm: We determined the features that were needed; then researched the vendors' offerings. We looked for platforms that would best match those features at the least cost.

However, shortly after we began our project, the City's procurement department and the Chief Technology Officer (CTO) informed us that there was a new paradigm that we needed to consider. We were asked to look carefully at the environmental impacts of the products we were evaluating and include those considerations as a significant part of our assessment. This has long been an important part of the

purchasing of many of the products that the City consumes, but this was the first time it had been applied so directly to IT equipment procurement practices.

It was a little hard to understand for most of us on the committee. We were IT geeks and the environmental impacts of the equipment we knew and loved had not been on our radar. However, we are all North-westerners and we love our mountains, forests, lakes, rivers and oceans. It wasn't a hard sell once we heard the facts as outlined above. Yet, the implementation of this new paradigm proved to be a little more problematic than the acceptance of it by the team.

To address the problem we developed a list of environmental questions as a part of the vendor evaluations. The questions covered toxic materials used in manufacturing and contained in the products themselves. They also asked about end of life recycling options and packaging. A list of the questions used is included in the addendum section. Vendors were informed that the environmental considerations would be given equal weight with the features and cost of their products.

This new way of looking at things was also a very unique idea to the vendor's sales representatives that we were working with. They didn't adjust quickly to what they perceived as 'new' concerns. This was information they were unfamiliar with and had not previously been provided to them by their companies. Part of our work was educating them about how to get environmental information about their products. It was a difficult and frustrating process for everyone concerned.

In the end, only two of the vendors gave us acceptable answers to our questions. Even those couldn't be rated very high as far as environmental responsibility. But at least they were trying and made the effort to answer our questions. As we'll see later, that turned out to be an important first step toward positive change.

Ironically, one vendor whose environmental stance is relatively well known, and generally ahead of others in the industry, never responded at all to our questions and was thus dropped from our considerations. This again emphasizes the trouble this nascent paradigm can cause as we all learn together how to make it work.

The vendor we ultimately chose was the one that had made the best effort to answer our questions and had thereby ended up with the highest score in that section. As it happened they also scored well in the features and cost so there was no question who won the contract.

2.2 Case study 2 – PDAs

Another IT procurement project is just coming to a close. It is an attempt to standardize on a single vendor for our handheld computers (PDAs, or personal digital assistants).

We chose to use a very similar set of environmental consideration questions. We made a few minor changes to address the differences between the platforms (e.g., PDAs do not have monitors attached, and thus some of the questions about lead in the glass were removed or changed). We sent them to the vendors and again emphasized that they would be given equal weight with the other considerations used to select a standard.

We learned once again that this is sometimes difficult information for sales representatives to gather. However, some of the sales representatives had been through this with us before. We were able to discuss the problems that we had run into in the past and together we found some new ways to gather the information. On the vendor side, they found that somewhere in their company structure there was usually a person in charge of environmental issues. Sometimes they were hard to locate, but ultimately they were the best resources. On our side, we found that many times the questions had been answered or were at least referenced on the company's website. With some digging we were able to find answers to some of our questions online.

This time around we had a much better response from all of the vendors. It took some time and was still a difficult task, but in the end we had at least some kind of response from nearly everyone. Some of them were quite extensive and complete and we learned a great deal about the efforts that many companies are making.

Once again, the vendor we ultimately chose had a good score in the environmental section to enhance the scores in the features and costs areas.

2.3 Case study 3 – LCDs vs. CRTs

The third procurement exercise was a study in which we compared CRT (Cathode Ray Tube) monitors to LCD (Liquid Crystal Display) monitors. We used an EPA funded study, 'The Life Cycle Environmental Impacts of CRT and LCD Desktop Monitors' (see references) to assess the environmental impacts of the manufacturing processes. We also ran tests and used modeling to compare the relative HVAC (Heating Ventilating Air Conditioning) and electricity use impacts in one of the City's largest buildings. This is a 67 story building in the south part of downtown Seattle that the City owns and has moved most of its departments into. The modeling we ran assumed CRTs in all offices and cubicles (6000 users) and then compared that with all LCDs. We also considered the amount of space taken up by CRTs vs. LCDs (a 15" LCD takes up about 28% of the space used by a 17" CRT and is about one (1) foot less in depth); their comparative life cycles (4–5 years for CRTs vs. 6–7 years for LCDs) and the ease of use.

It is interesting to note that due to our mild climate the HVAC impacts were nominal. However, the electricity use was considerably less for LCDs. Our research showed a difference between the two of 90.42 kWh/yr in favor of LCDs. As we have continued to monitor these data we have seen the cost of LCD monitors fall while electricity costs have risen by 50%, making the advantage to LCDs even more compelling.

When we looked at the overall life cycle costs and the environmental impacts we found that the environmental impacts of CRTs versus LCDs were considerable. From the manufacturing (less toxins used); to the packaging (a smaller size equals less packaging); to better ergonomics (less glare, less room used up on the desk); to the end of life (longer lasting and possibly fewer toxins needing to be recycled); all of our life cycle answers seemed to indicate LCDs were the best choice for our new monitor standard.

Once again, putting the emphasis on environmental stewardship and lifetime costs over initial cost resulted in a different decision than would have been made otherwise.

2.4 Lessons learned

From all of the case studies we learned that though it can be challenging, there are ultimately great rewards for making environmental sustainability an important part of our purchasing decisions. The first reward is simply the knowledge that what we do will help relieve the toxic burden on the planet. Another reward is one that the bean counters love to hear about: the real cost of the equipment goes down when we consider the end of life costs and the potential liabilities in disposing of toxic materials.

We also learned a great deal about where and how to find the information we needed. First, there are resources in most every large corporation dedicated to the environmental stance of their company. Sometimes they are part of the public relations department, sometimes deep in the engineering or development groups, but there are nearly always a good team of dedicated folks who are very happy to work with you to make their companies more responsive to environmental considerations.

Finally, we learned that it is possible to incorporate environmental responsibility into your procurement evaluations, legally and in a way that vendors can understand and work with. In the end, it was and is a positive experience for everyone involved. Some of those positive results are the subject of the next section.

3 The Results, or What Good Did It Do?

The relationship between the City and the vendor we chose has evolved with some positive and pertinent results. We standardized all of our desktops and laptops with one vendor. We have been rewarded by having made great strides in raising their level of environmental stewardship. Because they value our business and the good public relations, or PR, that environmental responsibility brings them, they have worked with us extensively to make their products more easily recyclable, to provide recycling that avoids dumping hazardous materials in other nations, and to address other environmental issues.

One example has been their development, with our guidance, of a special transportation cart. The cart was designed to our specifications to hold a large number of CPUs (the tower or desktop box of a computer workstation) and all their peripheral components (e.g., keyboard, mouse, cords, etc). The shelving is adjustable so it can accommodate different sized CPUs. The box is specifically designed to be sturdy and easy to ship. It is wheeled and of a size that it is easily moved onto and off of trucks and through doors and hallways. By putting 16 or so CPUs and their equipment in such a box, we save that many large boxes, all the packing materials that accompany them, as well as storage and unpacking space and handling time.

The vendor piloted the program with the City and it has been so enthusiastically received that they are expanding

the program to other companies and eventually expect to use these carts nationwide.

There is another example of this same vendor's willingness to work with us on environmental issues. We had identified an issue with our end of life practices for our computer equipment. The City has dealt with its older computers by salvaging them and donating them to the local school district and non-profits. This was a good solution as far as it went. But what happened to the computers when the schools or non-profits could no longer use them? The City is committed to recycling domestically and not disposing of its end-of-life electronics so we needed a better solution.

We recently met with the school district and the vendor and are developing a take-back program. The preliminary planning looks like we will pay a small, per unit fee to the vendor for each computer we purchase from them. In return they will take back a matching number of old computers from the school district or non-profits. The old computers can be any brand and need not have been purchased from the vendor. The vendor will then be responsible for certifying that all equipment has been recycled.

They have already identified an acceptable recycling company based on our requirements. Those included a company that is:

- Local (thus avoiding transportation costs and impacts)
- Certified (they certify that they will recycle all of the materials in a responsible manner – i.e. domestically, cleanly, and thoroughly)
- Reputable (they have a stellar reputation in the electronics recycling industry)

Finally, and significantly, this vendor and others are consistently eager to find new, better, and more sustainable practices. They recognize the value to their bottom line while also reaping the benefits of responsible citizenship within their communities.

4 The Tools, or How Do We Do This?

4.1 Currently available tools

There are many tools available today to help the procurement staff make these decisions. URLs (web addresses) are included in the references addendum.

Some specific tools of note are the EPA's Environmentally Preferable Purchasing web site. This site offers great information about what questions the purchaser should be asking, how to find the best products, and more. It includes a glossary of terms and case studies. The EPA also offers a database for environmentally preferable goods and services. Both of these resources address much more than electronics, but they are a great place to start learning about greening your purchases.

There are many environmental labels that apply to electronic equipment. Probably the best known in the U.S. is the EPA's Energy Star label. This focuses only on electricity use but has become a well-respected label that most procurement officials look for.

To find eco-labels that address IT equipment specifically we have to go outside the U.S. In Europe there is the ECMA (European Computer Manufacturers Association) and oth-

ers, but they have addressed few of our domestic products at this time. Their website can offer some good insight into the processes however, so we still recommend it as a resource.

Another resource from that side of the Atlantic is the TCO which is a Swedish organization that was started as a labor confederacy and has made quite a big impact on electronic equipment world wide, including here in the U.S. Again, we recommend spending some time on their website to learn more about their procedures and recommendations for electronics purchasing. The TCO label is a good one to look for and they are consistently expanding their market reach.

Another good source of information is the Northwest Product Stewardship Council's 'Guide to Environmentally Preferable Computer Purchasing' (see references).

4.2 Tools on the horizon

A group of people drawn from industry, environmental organizations, government and corporate purchasing, and academia are working on a project to develop a new tool to help in sustainable electronic product procurement. At this time they are called EPEAT (Electronic Product Environmental Assessment Tool), and their development team is working out the details of what that tool will look like. They are slated to be finished in early 2005, after which they will turn the development of the actual tool over to a host organization. It is hoped that this organization will be able to have the tool in production and available to corporate and government users by the end of 2005.

There are other activities and projects in the works that may also help in the future. Green Seal, an ecolabel based in the U.S., has begun to look at electronic equipment. A group called the Center for A New American Dream has established a Computer Procurement Network. They are developing a set of principles for environmentally sound computer purchasing they hope will eventually be used for purchasing specifications and contracts.

The City of Seattle is developing purchasing scorecards for IT equipment that will include environmental and sustainability criteria along with the technical specifications. We will be glad to share them with others once they are complete.

Bottom line is that there is help coming. Please take a look at all of the links in the references addendum and keep watching them for updates.

5 Conclusion, or Where Do We Go From Here?

We have seen that there is a real and important issue with electronic waste that each of us contributes to whenever we purchase IT equipment. We believe it is important to accept the ethical and societal duty inherent in that knowledge and work hard to find ways to green our purchasing standards.

First, get yourselves educated by reading everything you can on the subject. Our references page should be a good start to that learning.

Second, educate your peers and your vendors. Let them know why this is important to you and your organization, and point them to the resources so that they can get further educated.

Finally, make sure your procurement procedures incorporate a strong environmental component and give it enough weight to mean real change in your practices. Use that new environmental emphasis to influence your vendors to make lasting and creative changes to the way they do business.

There are many changes happening throughout the electronics markets that will make a difference in the environment we leave our children. Purchasing decisions we make today will affect generations to come. Working together as large coalitions of purchasers or government organizations will bring to

bear strong pressure on manufacturers and vendors to use more sustainable and environmentally sound practices.

That is our charge to you. Together we can make a better world. Let's do it.

6 Environmental Questions

The following document was used in our laptop standardization project as referenced in the 1st case study.

Vendors: Please answer the following questions to the best of your ability. Detailed answers will help us to make a more legitimate and valuable evaluation of your product. We must have the answers to these questions within the next 30 days or we will not be able to include your products in our procurement evaluation.

1. Which of your products meet General Environmental Standards/Labeling Requirements of the following? Please specify which products meet which standards/label requirements. (Euro EcoLabel; Environmental Choice Canada; TCO; Nordic Swan; Swedish IT Organization Eco-Declaration).
2. Do your products meet U.S. EPA EnergyStar labeling requirements?
3. Do you provide products or packaging which were manufactured without using and/or do not contain the following toxic materials of concern: Mercury, Cadmium, Lead, Halogenated Flame Retardants; Chlorinated Solvents (manufacturing); Chlorine-based Plastics?
4. If your products or their packaging contain any of the above toxic materials, please indicate which toxics are in which part of the product(s), and in what quantity.
5. Are your product parts containing mercury, cadmium, and/or lead (a) labeled and/or (b) removable? Indicate separately for each product.
6. Identify the recycled content materials in (a) your products and (b) your packaging. For each, distinguish the per cent of post-consumer recycled content.
7. Identify what recyclable materials are in your products, what steps are necessary to separate those materials from the product in order to recycle them, and whether they are labeled to indicate recyclability (for example, plastics identified by resin).
8. Identify what re-usable and recyclable materials are in your packaging, and what your firm does to provide re-use and recycling of packaging.
9. Are your products designed so they can be upgraded? If so, can your products be upgraded electronically?
10. Explain what your firm does to provide environmentally sound methods for handling equipment at the end of its useful life (demanufacturing, re-building, recycling of component parts. **NOTE: 'donation' is not considered end-of-life management?**

References

The Basel Action Network (BAN) is an international network of activists seeking to prevent the globalization of the toxic chemical crisis, <http://www.ban.org/>

The Center for A New American Dream, Computer purchasing strategies for governments, <http://www.newdream.org/procure/products/computers.html>

City of Seattle Copernicus Purchasing Project. This is the very successful project that has brought together representatives from all City departments to collaborate on purchasing decisions. It has resulted in significant cost savings. They sponsored the CRT vs. LCD study and are developing purchasing scorecards that include sustainability considerations. Lead: Ulla Johnson, phone: +1-206-615-0593

City of Seattle Distributed Computing and Commodities Team – part of the Copernicus project. This is a team made up of representatives from across all City departments. They sponsored both the PDA and laptop standardization projects. Lead: David Matthews, phone: +1-206-684-5199

City of Seattle Office of Sustainability and the Environment – many good resources for recycling. Shirli Axelrod, phone: +1-206-684-7804

Electronic Products Environmental Assessment Tool project; a multi-stakeholder process to design and implement a tool for evaluating the environmental performance of electronic products, <http://www.epeat.net/>

The European Computer Manufacturers Association (ECMA) is an international, industry association founded in 1961 and dedicated to the standardization of information and communication systems, <http://www.ecma-international.org/>

Karliner, Joshua (1997): The Corporate Planet: Ecology and Politics in the Age of Globalization. Sierra Club Books, p17, November

The Northwest Product Stewardship Council (NWPSC) is a group of government agencies working with businesses and non-profit organizations to integrate product stewardship principles into the policy and economic structures of the Pacific Northwest, <http://www.productstewardship.net/index.html>

Silicon Valley Toxics Coalition. A comprehensive site on high tech impacts on community, worker and environmental health, <http://www.svtc.org>

TCO The Swedish Confederation of Professional Employees, www.tcodevelopment.com

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